Global Journal of Poultry Farming and Vaccination

Vol. 2 (2), pp. 116-120, October, 2014. ©
Global Science Research Journals
http://www.globalscienceresearchjournals.org/

Review

Review work on farmer trite preferences for their breeding objectives of local chicken ecotypes in Ethiopia

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Accepted 8 October, 2014

Abstract

An exploratory data assessing review survey from previously reported data was conducted in Ethiopia to identify the breeding objectives and trait preferences of farmers in chicken production. Wilcoxon, signed ranks test from the scattered data for breeding objectives of the respondents were incomes, cultural/religious reasons, more meat and egg production with the overall index value of 0.3, 0.27 0.22 and 0.21, respectively. Overall genetic improvement of the preferred traits were varied in sexes like comp type, plumage color, body weight, breeding ability and body conformations with the index values of 0.25, 0.23, 0.22, 0.22 and 0.08 for males and 0.09, 0.22, 0.20, 0.23, 0.26, respectively for females through uncontrolled breeding. Highly preferred traits are a good predictor of the breeding objectives of chickens' production. In general, traits are important for selecting chickens a market for meat for consumption and breeding purpose in Ethiopian Therefore, this Preference Traits and Breeding Objectives of Farmers are important to improve the genetic part of chickens in the country.

Key words: Breeding objectives, traits, chicken ecotypes, Ethiopia

INTRODUCTION

Poultry species are included all domestic birds (Gallus domestics) like chickens, turkeys, ducks, geese, ostriches, guinea fowls, doves and pigeons. In Ethiopia, except chickens others are found in their natural habitat whereas geese and turkeys are exceptionally not common (Tadelle et al., 2003). Such poultry species contributed important socio-economic roles for food securities, generating additional cash incomes and religious/cultural reasons (Salam, 2005). Almost all rural and many peri-urban families keep small flock scavenging local chickens (Jens et al., 2004).

On the other hand there is no well organized data on the breeding practice of farmers of chicken production in Ethiopia. However, farmers in the view to increase meat and egg production follow their own breeding practice through selection based on some criteria mostly related to color, comb type, weight, egg production and growth rate (Halima, 2007; Bogale, 2008; Fisseha et al., 2010). Nigussie (2011) reported that the breeding practices of farmers were allowing cocks and hens to mate indiscriminately without systematic mating where the dominant cocks in the neighborhood are used as a sire line.

Some researchers (Tadelle, 2003; Halima, 2007; Nigussie et al., 2009) have made phenotypic and genetic characterization of indigenous chicken in some parts of Ethiopia. Poultry production and marketing system in three districts of southern Ethiopia was conducted by Mekonnen (2007), phenotypic and genetic characterization of indigenous chickens in Northwest Ethiopia by Halima (2007), genetic parameters on Horro chickens for weights and egg production traits by

Nigussie et al. (2010) and breeding objective and trait preferences of village poultry producers in same selected parts of Ethiopia by Nigussie (2011). However, the above mentioned authors were area specific and didn't present data in organized form. Therefore, comprehensive data organization at country level on local chicken breeding objectives in general and trait preference in particular is mandatory. So, this reviewed work was carried out to assess chicken breeding objectives, trait preferences and practices employed in the country.

MATERIALS AND METHODS

Description of the Study Area

Ethiopia is located in northeastern part of Africa having 97 million human, 49 million chicken and 53 cattle population of officially the Federal Democratic Republic of Ethiopia (CSA, 2011). A rugged country of tall mountains and arid deserts, Ethiopia has a diverse population, with more than 70 distinct ethnic and linguistic groups known as Abyssinia until the 20th century which is the oldest independent nation in Africa. It was home to the powerful Christian kingdom of Aksum that flourished from around the first century. After the 1500s Ethiopia divided into a number of small kingdoms, which were reunified by Menelik II in the 1880s (Encarta, 2009).

The same source indicated that Ethiopia is bounded on the northern by Eritrea and Djibouti, on the eastern and southeast by Somalia, on the southwest by Kenya, and on the west and North West by Sudan. The country is divided in to nine regions, one for each of its main ethnic groups.

Sampling Techniques and Frame Works

First single rapid exploratory data observation was considered before the main data interpretation work was started to know and strengthen the sampling methods based the availabilities of works done before. Simple random sampling techniques were considered in the research works to evaluate the breeding objectives, trait preferences and practices of farmers in the country. Finally data was assessed in the three randomly selected regions of the country (Amahara, Tegray, and southern nation and nationalities of people (SNNP)).

Data Management and Statistical Technique

Data was managed in softcopies. All data were managed using Microsoft Excel computer programme. Simple descriptive statistics on chicken trait preferences, breeding objectives and practices were analyzed by using SAS Soft ware program (SAS, 9.0 versions, 2002).

Breeding Objective and Practices

Importance of chickens, farmers' trait preference and identifying production environments are important information to implement breeding schemes in back yard chicken production systems in Ethiopia (Nigussie, 2011). Breeding objective is linked to be genetic improvement of different character as practicing selection criteria including economically important traits related to plumage color, body weight, adaptation, reproductive performance and egg number (Abdelqader et al., 2007; Muchadeyi et al., 2009; Nigussie, 2011). Production of eggs for consumption is the principal function of chicken production in Ethiopia followed by source of income and meat for home consumption (Halima, 2007; Nigussie, 2011).

Traditional Breeding Practice

Farmers have their own criteria and strategies of culling and selecting chickens that are being practiced at any time of the year (Halima, 2007). Mainly farmers cull their chickens for home consumption, religious sacrifices and as a source of income through selling. All farmers in different regions traditionally give greater selection emphasis for breeding and replacement males and females such as plumage color, live weight, comb type, conformation and laying performance of their parents (Halima, 2007; Nigussie, 2011).

Breeding, farmers in the Amhara (Farta) and Oromia (Horro) regions give the highest emphasis for plumage color while in the southern region (Konso and Sheka) live weight is used as the most important selection criteria. The emphasis given to each trait category is largely similar across the sexes except that, unlike for males, live weight is most important in Mandura and almost equally important to comb type in Farta for selecting breeding females (Nigussie, 2011). Even if farmers have their own breeding and selection criteria, there is no designed selection and controlled breeding of village chickens. Thus, breeding of village chickens is completely uncontrolled (Meseret, 2010). Those local chickens are small in number per HH and the number of breeding male birds in each household was less than required for breeding purpose that alleviate inbreeding rate (Tadelle, 1996; Tadelle et al., 2003).

Modern Breeding Practice

Even if there is no recorded evidence indicating the exact time and locations of introduction of the first batch of exotic breeds of chickens into Ethiopia for genetic improvement, it is widely believed that the importation of the first batch was done by missionaries (Meseret, 2010). The first four breeds of exotic chicken (Rhode Island Red, Australoup, New Hampshire and White Leghorns) were imported to Jimma and Alemaya College of Agriculture in 1953 and 1956,

Table 1: Major breeding objectives and its index with rank values in the country

Breeding objectives	Amahara	SNNP	Tegray	weighted value
Meat (home consumption)	0.22(3)	0.22(2)	0.23(3)	0.21(4)
Egg (home consumption)	0.11(4)	0.40(1)	0.12(4)	0.30(1)
Cultural/Religious	0.33(2)	0.22(2)	0.30(2)	0.27(2)
Source of income	0.34(1)	0.16(3)	0.35(1)	0.22(3)

In the bracket number most important = 1, least important = 4

Table 2: Farmers' preference and index with rating of trait categories most influencing production and price of live chickens in different regions

Traits preference	Amahara		SNNP		Tegray		weighted value	
	M	F	M	F	M	F	M	F
Color	0.20(3)	0.20(3)	0.21(2)	0.18(4)	0.19(2)	0.30(1)	0.23(2)	0.22(3)
Comb type	0.18(4)	0.15(5)	0.29(1)	0.22(2)	0.12(4)	0.15(5)	0.25(1)	0.09(5)
Conformation	0.23(1)	0.17(4)	0.19(3)	0.15(5)	0.19(2)	0.22(2)	0.08(4)	0.26(1)
Weight	0.17(5)	0.23(2)	0.18(4)	0.26(1)	0.17(3)	0.16(4)	0.22(3)	0.20(4)
Breeding ability	0.22(2)	0.25(1)	0.13(5)	0.21(3)	0.33(1)	0.17(3)	0.22(3)	0.23(2)

Ranks of trait functions within a column bearing different numbers are different from each other. The importance of characters was rated based on attributed to each function of chickens by individual respondents; most important = 1, least important = 5

respectively under USAID project (Solomon, 2007). In the 1980s the Ministry of Agriculture initiated importation and distribution of cockerels to be used as breeding males in villages. This scheme again failed because farmers were unwilling to remove their local cocks and the exotic cocks failed to adapt in the village environments (Nigussie, 2011). Hence the indigenous chickens are better in adapting harsh environment, disease tolerance and brooders but poor in reproductive performance (Nigussie, 2011). To improve the performance of local chicken additional exotic breeds were imported such as (White and brown Leghorns, Rhode Island Red, New Hampshire, Cornish, Australoup, Light Sussex etc.) crossing with local chicken (Nigussie, 2011). Many evaluations were done on crossbred chickens at the Debre Zeit agricultural research centre indicated that 62.5% white leghorn crosses showed superior performance to the locals as well as pure white leghorns in terms of egg production in a cross breeding program at Assela (Brannang and Persson, 1990). So far increasing level of exotic inheritance (>50%) resulted in loss of broody behavior, a trait of considerable economic value under village systems (Nigussie, 2011).

Exotic breeds require high input and thus promoting them only if farmers packaged in improved business potentials. That means accesses to markets, transport facilities, veterinary products and timely availability of replacement new stock using high-yielding breeds cannot be a sustainable option for improving village poultry. This requires defining production environments and identifying the breeding practices, production objectives and trait choices of village farmers as inputs for developing appropriate breeding strategies (Nigussie, 2011).

Breeding Objectives of Chickens

According to the information obtained from review papers chickens with different traits in the study country is based on essential breeding objectives such as obtaining well performed chicken for egg production (for home consumption), source of income, meat production (for home consumption) and cultural/religious contribution within the overall index value of I = 0.30, I = 0.22, I = 0.21 and I = 0.27, respectively. The function of chickens as source of cultural/religious role was rated to be the second important breeding objective of chicken, whereas meat (for home consumption) was more important than egg production (Nigussie, 2011).

Trait Preferences of Farmers

Preferred traits of farmers in the country are presented in Table 2. All interviewed farmers practiced selection to pick breeding and replacement cocks and hens to improve the genetic parts and obtain well performed chickens based on five trait categories such as plumage color, live weight, comb type, conformation and breeding ability of chickens. The emphasis given to each trait category is different in sexes in all districts unlike the report of Nigussie (2011).

Farmers give the highest emphasis for conformation, breeding ability, comb type, live weight and plumage color is used as the most important selection criteria with index value of 0.23, 0.25, 0.29, 0.26, 0.33 and 0.30 for male and female chickens, respectively. The emphasis given to each trait category is not similar across the sexes. As a result this criterion is essential for farmers to buy breeding cocks and hens for production and religious contribution for home consumption. While unwanted ones were disposed by slaughter and sale.

Moreover, each of these preferred traits consist different components as used for selection criteria. Multi and red colors were the two important preferred traits used for selecting of chickens on the basis of body plumage colors. Whereas, chickens having red braunish, white with red tips, black with white tips and white black red trips plumage colors are less favored by respondents for consumption, marketing and breeding chickens. According to the participant households' information white color chickens are easily exposed for predators and those are the main discrepancy of the chicken owners in the study area. However, farmers strongly dislike chickens having black color as compared to the others. In the same way, farmers in all regions recognized two types of combs for the trait category of single (Netela) and doublex (Dimedem (comprised all comb types other than single (like: rose, pea and v-shape). Doublex was a favored comb type both for females and males suggesting that all of the farmers placed equally higher preference for any comb type other than single. No specific trait components were identified for the other trait categories like weight, conformations and breeding ability, except that all farmers stated that they selected chickens that are heavier in respect of their age mates, those having attractive conformations and asking the owners by judging subjectively by hand weighing, visual appraisal and in parents' history of chickens, respectively.

Breeding Practice of Chicken

Even if farmers had preferred traits and breeding objectives, there is no designed selection and controlled breeding of village chickens. All identified chicken ecotypes were moved freely in and around the compound of the village through cocks and hens mate indiscriminately without systemic mating where aggressive cocks in the vicinity tend to be a sire. Though breeding practices of the village chicken owners were completely uncontrolled and replacement stocks were produced through natural incubation using broody hens.
Lack of hatching ability, frequent broodiness, single comb and black plumage colors are the major factors of culling of chickens from the flock. The farmers in the districts seem to be very conscious and concerned in the preparation of appropriate incubation nest boxes and place to set the broody hens. The respondents placed the incubation boxes in a protected, quite and dark corner of the family with the use of cereal straws bedding either on clay pot or on bare ground sandstones. All respondents didn't mind the position of incubated eggs. Whereas, during dry seasons (January-May) strongly in low land and any time weakly in high land farmers are left the broody hens to stop broody behaviors naturally using different methods to modify the broody manners when incubation was not desired and the hens were required to start again mating and laying faster. Some of the most popular methods were hanging the hen up-side-down and moving the hen to neighboring houses and tethering hens for three days.

CONCLUSIONS

Breeding objectives of the farmers are linked to increase performances per animals through obtaining well performed chickens for meat, egg and religious roles to insure their incomes and home consumptions. The most preferable traits are body conformation, body weight, plumage color, comb type and breeding ability of chickens. Whereas, the breeding practices in the country is uncontrolled mating and absence of planned breeding programme.

RECOMMENDATIONS

- Special emphases on awareness creations of farmers need to be placed for productive traits rather than colors and comb types.
- The future breeding programme development should incorporate the breeding objectives of farmers'.

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